

Advanced Classroom Greenhouse: Intended for university courses in horticulture. Most instructors will have a good understanding of how to operate a greenhouse and should have input in the design stages. Average size: Varies dramatically based on project requirements.

1. Side Wall Vents

Description: Aluminum framed, awning hinged windows with fiberglass screens and safety covers.

Size: Typically 3' wide x 2' tall.

Operation: Motorized drive shaft with scissor arm operators; 115V; activated by the control system (below).

Manufacturer: Vents-Sunshine Rooms, Inc.; drive system-Lock; controls-Wadsworth.

Purpose: Allows fresh air intake at bottom of greenhouse.

Suggested qty.: Lean-to styles, continuous on longest wall; traditional style, continuous on two sides.

Notes: Must be used in conjunction with ridge vents. Traditional rack and pinion operators are not recommended due to their appearance, space consumption, and safety concerns. Each vent motor will require a control box separate from the control system.



2. Ridge Vents

Description: Aluminum framed, ridge vent windows.

Size: Typically 3' wide x 2' tall.

Operation: Motorized drive shaft with scissor arm operators; 115V; activated by the control system (below).

Manufacturer: Vents-Sunshine Rooms, Inc.; drive system-Lock; controls-Wadsworth.

Purpose: Extract hot air from greenhouse, pulling fresh air in from wall vents.

Suggested qty.: Continuous along ridge.

Notes: Must be used in conjunction with side wall vents. Traditional rack and pinion operators are not recommended due to their appearance, space consumption, and safety concerns. Each vent motor will require a control box separate from the control system.



3. Operable Door(s)

Description: Aluminum framed, narrow stile, commercial door.

Size: Typically 3' wide x 7' tall.

Operation: Push/pull hardware.

Manufacturer: Manko.

Purpose: Provides access in and out of the greenhouse (may be a fire exit).

Suggested qty.: As needed per project.

Notes: Panic hardware, 42" wide and 6' wide double doors are available.



4. Horizontal Air Flow (HAF) Fans

Description: Fan with wire basket suspended from rafters.

Size: 12" diameter.

Operation: 115V; activated by the control system (below).

Manufacturer: Schaefer model VT12PA.

Purpose: Use in pairs to create gentle, horizontal air circulation.

Suggested qty.: Two per 750 sq. ft. of floor area.

Notes:



5. Heater

Description: Ceiling suspended unit heater (natural or LP gas available).

Size: Determined per geographic region, glazing and usage.

Operation: 115V; activated by the control system (below).

Manufacturer: Modine models Hot Dawg or Effinity.

Purpose: Keep plants alive and people comfortable during winter months.

Suggested qty.: Determined per region, glazing and usage. Call for support.

Notes: Heat may be supplied by the building's primary heat system if controlled separately. Gas heaters will require gas piping and venting duct work.



6. Shade System

Description: Shades for the roof area using built-in shade tracks.

Size: Width to match bay for the length of the roof.

Operation: Motorized; 120V; Activated by the control system (below).

Manufacturer: Thermal Designs model Comfort Glide; Somfy model LT50.

Purpose: Reduce glare and heat in warmer months; provide insulation during winter nights.

Suggested qty.: Every bay for roof area and possibly west facing walls.

Notes: Fabric and color selection by architect.



7. Exhaust Fans

Description: Aluminum exhaust fan(s) made especially for greenhouses with aluminum slant-wall housing, louvers, and safety grill.

Size: Typically, 1/3hp, 30" fans are adequate though many sizes are available.

Operation: 115V; activated by the control system (below).

Manufacturer: American CoolAir.

Purpose: Extract hot air, pulling fresh air in from intake shutters.

Suggested qty.: Typically, one is adequate (two in southern climates).

Notes: Used in conjunction with intake shutters on opposing walls.



8. Air Intake Shutters

Description: Aluminum air intake shutters.

Size: Typically 21" x 21".

Operation: Motorized; 115V; activated by the control system (below).

Manufacturer: American CoolAir.

Purpose: Shutters open when the exhaust fan comes on providing fresh air.

Suggested qty.: Typically two 21" shutters per exhaust fan.

Notes:

**9. Permanent Evaporative Coolers**

Description: Exterior mounted evaporative coolers.

Size: Approx. 3' wide x 3' deep x 3' tall; 1/2hp motor.

Operation: 115V; activated by the control system (below).

Manufacturer: Champion model AS2C51.

Purpose: Supplies cool, humid air to plants.

Suggested qty.: Typically one or two units placed each side of greenhouse.

Notes: Requires ductwork, setting pads, and plumbing.

**10. Environmental Control System**

Description: A greenhouse specific, "mid-level," five-stage control system with corrosion resistant cabinet, contactor panel, blueprints and temperature sensor.

Size: 16" x 16" x 5" deep cabinet; 14½" x 16½" x 6¼" deep contactor panel.

Operation: 115V; two stages of heating; three stages of cooling.

Manufacturer: Wadsworth model STEP50A control.

Purpose: Central controller for most cooling and heating equipment including wall and ridge vents, exhaust fans, intake shutters, HAF fans, heater, and evaporative coolers.

Suggested qty.: One per greenhouse (or per zone).

Notes: One day on site training recommended unless operator has prior experience in the operation of a control system.

**Optional Equipment****11. Growing Benches**

Description: Aluminum frame benches with stationary legs and plastic tops.

Size: 3' tall x 3' wide x 3', 4', and 6' lengths.

Operation: n/a.

Manufacturer: Frames-Sunshine Rooms, Inc.; tops-Dura-Bench.

Purpose: Provides a growing area for plants.

Suggested qty.: Typically around the perimeter and center of the greenhouse.

Notes:



Optional Equipment

12. Potting or Work Tables

Description: Stainless steel top work tables

Size: 36" tall x 30" wide x 48" or 60" long.

Operation: n/a.

Manufacturer: Eagle or equal.

Purpose: Provides an area to work with plants and study area.

Suggested qty.: Two or three per average sized greenhouse.

Notes: Optional sink and lower shelf are available.



13. Built in Misting System

Description: An automatic PVC mist distribution system with timer controls, solenoid valve, and misting nozzles to cover a 6' x 50' area.

Size: ½" sch40; 50' length.

Operation: Control-120V; activated automatically.

Manufacturer: Phytotronics automatic misting kit.

Purpose: Effective, automated method to supply moisture to plants.

Suggested qty.: Typically one system per greenhouse (or per misting zone).

Notes: Kit includes timer controls, solenoid valve, risers, misting nozzles, strainer, PVC pipe and fittings, 20' of 2-conductor wire, one brass hose adapter, PVC primer and glue, and Teflon tape. Supply plumbing up to the solenoid valve will be required by the plumbing contractor.



14. Built in Watering System

Description: An automatic PVC water distribution system with timer controls and plumbing kit to cover 50'.

Size: ½" sch40; 50' length.

Operation: Control-24VAC plug-in transformer; activated automatically.

Manufacturer: Phytotronics model Trident T3A system.

Purpose: Effective, automated method to water the roots of plants.

Suggested qty.: Typically one system per greenhouse (or per watering zone).

Notes: Supply plumbing up to the system will be required.



15. Alarm Manager for Environmental Control System

Description: An add-on of the control system that will automatically call up to four phone numbers with custom alarm messages.

Size: 8¾" x 4¾" x 2½" deep box.

Operation: 115V.

Manufacturer: Wadsworth Alarm Manager.

Purpose: Protect your plants and work from unusually harsh weather or an equipment failure.

Suggested qty.: One per greenhouse.

Notes: Does not require separate phone line.



Optional Equipment

16. WeatherMonitor for Environmental Control System

Description: An add-on of the control system that monitors wind speed, direction and frost conditions.

Size: 16" x 16" x 5" deep cabinet; Mast-10' tall.

Operation: 115V.

Manufacturer: Wadsworth WeatherGuard.

Purpose: Overrides the regular settings to prevent plant or greenhouse damage.

Suggested qty.: One per greenhouse.

Notes: Includes the exterior mounted weather mast and dedicated control box.



Other Equipment to Consider by Other Trades

17. Water Supply

Multiple water spigots with watering and misting hoses.

18. Floor Drains

At least one per greenhouse will ease cleaning considerably.

19. Grow Lights

Since these would be installed by a licensed electrician they should also supply them. We recommend high pressure sodium fixtures by P.L. Light Systems, 1-800-263-0213.



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